Claim 12, for instance, now requires at least one dispenser of a first material that is a solvent with respect to a second material on a wafer. Honda discloses applying a solution -- a developer -- from a nozzle. (Honda translation at ¶0009.) By definition, a solution contains a first material that is a solvent with respect to a second material making up the solution -- a solute. However, the first material in Honda's solution is not a solvent with respect to a material on Honda's substrate. This is demonstrated by Honda's indication that the developer alone is insufficient to remove a resin from the substrate. Rather, additional processing is required. Specifically, Honda repeatedly teaches that the developer is to be applied before a subsequent developing process. (*See* ***Id.*** at p.1 last line- p. 2 ln. 1; p. 2 ln. 13-15; p. 3 ln. 32-33; p. 4 ln. 26.) Further, Honda teaches that, in the past, the developer and additional processing were still not necessarily enough to remove the resin. (***Id.*** at p. 3 ln. 17-20.) Moreover, it is noteworthy that Honda discloses that the developer is placed over the entire substrate, which is then subjected to the additional processing. (***Id.*** at p. 4 ln. 26-27; p. 5 ln. 6.) If the developer was a solvent with respect to the resin, then it would automatically dissolve all of the underlying resin. This runs contrary to the teachings of Honda, which requires a certain pattern of resin to remain. Accordingly, Honda fails to anticipate claim 12 as well as its dependent claim 13.

Claim 14 now requires a dispensing mechanism that is configured to deliver a chemical that dissolves a bead on the preamble's wafer. As discussed above, Honda's arguably analogous nozzle 12 fails to deliver a chemical that dissolves resin on Honda's substrate. As a result, Honda fails to anticipate claim 14.

Claim 17 requires a nozzle configured to apply an edge bead-dissolving substance to an edge of a wafer addressed in the preamble, thereby distinguishing that claim and dependent claim 18 from Honda for reasons discussed above. Further, claim 19, while no longer dependent upon claims 17 and 18, expressly requires this limitation and is therefore distinguished as well.

Claim 20 now requires a solvent dispenser aligned with an edge of a wafer addressed in that claim's preamble. This is in contrast to Honda, wherein figure 3 illustrates that both of its nozzles 12 are out of alignment with the edge of the substrate 1. Dependent claim 21 benefits from this distinction as well.

Similarly, claim 22 already discloses without further amendment a first solvent nozzle poised at an edge of the preamble's wafer as well as a second solvent nozzle also poised at that

edge. For the reasons discussed above in support of claims 20 and 21, Honda fails to disclose these limitations as well, thereby failing to anticipate claim 22 and its dependent claim 23.

Claim 24 requires a first dispenser that is disposed in a certain way while dispensing a chemical that dissolves a material on the preamble's workpiece. For the reasons addressed in support of the novelty of claim 12, Honda fails to disclose this limitation as well. Claim 25, being dependent upon claim 24, benefits accordingly. Formerly dependent claim 26, however, already expressed a limitation that Honda fails to disclose. Namely, claim 26 requires a second dispenser that is disposed toward an edge of the workpiece. For the reasons addressed in support of the novelty of claim 20, Honda fails to disclose this limitation. Therefore, claim 26 is amended only to expressly incorporate the limitations of claims 24 and 25 as they appeared before this Amendment and Response. Dependent claim 27 benefits from the preexisting limitation of claim 26 as well.

Claim 28 has been clarified to require a nozzle that is configured to couple to a source of a chemical that can dissolve a material on a substrate first mentioned in the preamble. Honda's nozzles, on the other hand, are not configured to couple to such a source, as discussed above.

As for claim 29, it now requires a dispenser having a particular orientation during a dissolution process as well as a vacuumer having a certain position during that dissolution process. Honda's disclosure does not address the position or orientation of its arguably analogous devices during a dissolution process. Specifically, when Honda's nozzles 12 and vacuum-suction part 11 are in operation, such operation cannot be accurately termed as a dissolution process because the developer from the nozzles 12 does not dissolve the resin on the substrate 1. As a result, Honda fails to disclose the limitations of claim 29 and the dependent claim 30 that incorporates these limitations. Further, claim 31, while no longer dependent upon claims 29 and 30, expressly requires these limitations. Therefore, claim 31 and its dependents 32-33 are distinguished as well.

II. Rejection of claims under 35 U.S.C. §102(b)

The Examiner rejected pending claims 14-18, 20-21, 24, and 28-30 as being anticipated by Uchida. Applicant contends that the current state of the claims contain limitations that distinguish those claims from the matters disclosed in Uchida.

Claim 14, for example, requires a negative pressure mechanism configured to be spaced from a bead on the wafer addressed in claim 14's preamble. Uchida does disclose a 180-micron distance between Uchida's suction port tip and a "substance to be coated." The "substance to be coated" is identified in Uchida's figure 3 by keying number 12. (*See* new translation of Uchida, bottom of p. 4. Applicant notes that the original translation expressed that the text corresponding to keying number 12 indicated a "surface" to be coated. However, a careful comparison of the four Japanese symbols associated with keying number 12 and the identical first four symbols associated with the 180-micron gap figure suggests that the translated phrases should also be identical. A consultation with Applicant's translator confirmed that both instances should refer to a "substance" to be coated. Applicant has submitted the new translation in an accompanying Information Disclosure Statement and as an Appendix to this Amendment and Response accordingly.) This 180-micron distance is due to the fact that there is an material between Uchida's suction port 2 and the "substance to be coated" 12. This material is identified as the "thick . . . part 11" of the coating layer, and there is no spacing between Uchida's suction port 2 and that thick part 11 of the coating layer. (See Uchida's figure 3.) Rather, port 2 is "immediately opposite thick part 11" and actually contacts the coating layer. (*See* Uchida translation at p.3, last ¶.) As a result, Uchida fails to disclose the amended limitation expressed in claim 14, expressed in formerly-dependent claim 15, and incorporated in dependent claim 16.

Similarly, Applicant has amended claim 17 to require a vacuum mechanism that is offset from an edge bead during application of an edge bead-dissolving substance. As discussed above, Uchida not only fails to disclose this limitation but actually teaches the opposite by requiring its suction nozzle to contact the coating layer. Dependent claim 18 benefits accordingly.

Claim 20 already contains a limitation for a negative pressure device defining a vacuum area intersecting the preamble's wafer. Dependent claim 21 also incorporates this limitation. By

disclosing a suction nozzle that merely abuts against a coating layer, Uchida fails to disclose such an intersection.

Claim 24 is already limited to a negative pressure device that is spaced from all surfaces of a workpiece (first mentioned in the preamble) while acting upon that workpiece. Contrary to this limitation, Uchida discloses a suction nozzle that is not spaced from at least one of the surfaces of the substrate. Specifically, the suction nozzle is not spaced from the thick part 11 of the coating layer. (*See* Uchida's figure 3; translation at p.3, last ¶.) Such a contrary disclosure indicates a failure to meet the limitation expressed in claim 24.

Claim 28 has been clarified to address a vacuum device that is spaced from a certain material. Assuming *arguendo* Uchida's suction nozzle 1 and thick part 11 of the coating layer are deemed to be analogous, Uchida fails to disclose this limitation by failing to space its suction nozzle 1 from the thick part 11 of the coating layer.

Applicant has amended claim 29 to require that its vacuumer be separate from the outermost surface of a wafer (addressed in the preamble) during a particular process. Assuming *arguendo* that the process disclosed in Uchida is analogous to the one addressed in this claim, Uchida requires the exact opposite: that the arguably analogous suction nozzle 1 contact the outermost surface -- the thick part 11 of the coating layer -- of the substrate. This distinction applies to claim 30 as well and, as a result, both claims are distinguished from Uchida.

III. Rejection of claims under §103

The Examiner rejected claims 19, 22- 23, 25-27, and 31-33 as being obvious in light of Uchida in combination with Honda. In supporting these rejections, the Examiner "deemed" the Uchida apparatus to be spaced from the substrate. Applicant asserts that, while the Uchida apparatus is necessarily distal from at least one portion of Uchida's workpiece (180 microns from the substance to be coated 12, for example) the Uchida apparatus also directly contacts at least one other portion of the workpiece, namely, the thick part 11 of the coating layer. Such contact is discussed at page 2, lines 34-41 of the translated Uchida text as well as Uchida's figure 3. As a result, the basis for the Examiner's rejection is faulty. Moreover, such teaching is in direct opposition to the teachings of Honda, wherein Honda's nozzles 12 avoid direct contact with any

part of the relevant workpiece 1. (*Compare* Honda's figure 3 *with* Uchida's figure 3.) As a result, one of ordinary skill in the art is discouraged from combining the two references; and the Uchida/Honda combination should not be used to reject the relevant claims.

Conclusion

In light of the above amendments and remarks, Applicant submits that claims 12-33 are allowable over the applied references. Therefore, Applicant respectfully requests reconsideration of the Examiner's objections and rejections and further requests allowance of all of the pending claims. If there are any matters which may be resolved or clarified through a telephone interview, the Examiner is requested to contact Applicant's undersigned attorney at the number indicated.

Respectfully submitted,

Date: 12/6/00

Charles B. Brantley II
Reg. No. 38,086
Micron Technology, Inc.
8000 S. Federal Way
Boise, ID 83716-9632
(208) 368-4557
ATTORNEY FOR APPLICANT

Appendix I
Marked-up version of claims indicating current amendments

12. (Twice amended) A processor for a spin coating device including a chuck defining a wafer accommodation area, comprising:

at least one [solvent] dispenser of a first material that is a solvent with respect to a second material on a wafer configured to occupy said wafer accommodation area; and

a suction mechanism generally around said at least one solvent dispenser and offset from said wafer accommodation area during an operational mode of said device.

13. (Twice amended) The processor in claim 12, wherein said at least one [solvent] dispenser further comprises:

a first [solvent] dispenser on a first side of said wafer accommodation area; and

a second [solvent] dispenser on a second side of said wafer accommodation area.

14. (Twice amended) A bead remover for a wafer, comprising:

a negative pressure mechanism configured to be spaced from a bead on said wafer while operating upon said bead [wafer]; and

a [solvent-]dispensing mechanism aligned with said negative pressure mechanism, wherein said dispensing mechanism is configured to deliver a chemical that dissolves said bead.

15. (Once amended) [The bead remover of claim 14] A bead remover for a wafer, comprising:

a negative pressure mechanism configured to be spaced from a bead on said wafer while operating upon said bead; and

a solvent-dispensing mechanism aligned with said negative pressure mechanism, wherein said solvent-dispensing mechanism is concentric to said negative pressure mechanism.

17. (Twice amended) An edge bead remover configured to service a spinning wafer, comprising:

a nozzle configured to apply [a solvent] an edge bead-dissolving substance to an edge of said wafer; and

a vacuum mechanism enveloping said nozzle and offset from [said] an edge bead during [solvent] application of said substance to said edge.

18. (Once amended) The edge bead remover of claim 17, wherein said vacuum mechanism is configured to remove said [solvent] substance from said edge.

19. (Once amended) [The edge bead remover of claim 18,] An edge bead remover configured to service a spinning wafer, comprising:

a nozzle configured to apply an edge bead-dissolving substance to an edge of said wafer; and

a vacuum mechanism enveloping said nozzle and offset from said edge during application of said substance to said edge, wherein said vacuum mechanism is configured to remove said substance from said edge, and wherein said vacuum mechanism envelopes said edge.

20. (Twice amended) A material removal system for a wafer, comprising:

a negative pressure device defining a vacuum area intersecting said wafer while said device is in an operational position; and

a solvent dispenser intersecting said vacuum area and aligned with an edge of said wafer while said device is in said operational position.

21. (Twice amended) The material removal system of claim 20, wherein said negative pressure device is distal from said wafer while said device is in [an] said operational position.

24. (Twice amended) A chemical dispensing system for a workpiece, comprising:

a negative pressure device defining a portal disposed toward and spaced from all surfaces of said workpiece while acting upon said workpiece; and

a first [solvent] dispenser within said negative pressure device and disposed toward at least one surface of said workpiece while [acting] dispensing a chemical that dissolves a material on [upon] said workpiece.

26. (Once amended) [The chemical dispensing system in claim 25, further comprising] A chemical dispensing system for a workpiece, comprising:

a negative pressure device defining a portal disposed toward and spaced from all surfaces of said workpiece while acting upon said workpiece, wherein said portal is spaced around an edge of said workpiece;

a first solvent dispenser within said negative pressure device and disposed toward at least one surface of said workpiece while acting upon said workpiece; and

a second solvent dispenser within said negative pressure device, disposed toward said edge, and opposing said first solvent dispenser.

28. (Twice amended) A chemical remover for a substrate, comprising:

a nozzle directed toward said substrate during a [solvent] dispensation mode and configured to couple to a [solvent] source of a chemical that can dissolve a material on said substrate; and

a vacuum device spaced from said [substrate] material and directed toward said nozzle during said [solvent] dispensation mode.

29. (Twice amended) A profiler for a wafer, comprising:

a [solvent] dispenser perpendicular to said wafer during a [fabrication] dissolution process; and

a [solvent] vacuumer surrounding at least a portion of said [solvent] dispenser and separate from an outermost surface of said wafer during said [fabrication] dissolution process.

30. (Once amended) The profiler in claim 29, wherein said [solvent] dispenser further comprises a location wherein solvent exits said [solvent] dispenser; and wherein said [solvent] vacuumer surrounds said location.

31. (Twice amended) [The profiler in claim 30, further comprising] A profiler for a wafer, comprising:

a dispenser perpendicular to said wafer during a dissolution process and comprising a location wherein solvent exits said dispenser;

a vacuumer surrounding at least a portion of said dispenser and separate from said wafer during said dissolution process, wherein said vacuumer surrounds said location; and

an additional [solvent] dispenser perpendicular to said wafer; wherein said [solvent] vacuumer surrounds at least a portion of said additional [solvent] dispenser.

32. (Twice amended) The profiler in claim 31, wherein said [solvent] dispenser is disposed toward a top side of said wafer.

33. (Twice amended) The profiler in claim 32, wherein said additional [solvent] dispenser is disposed toward a bottom side of said wafer.

Appendix II

Supplemental translation of Japanese reference 56-73579 by Uchida

FAX MESSAGE

from

Hugh Burleson Translations Fax: (425) 746-9799 H me: 746-9675
1332 183rd Ave. NE, B llevue, WA 98008 (UBI# 601-860-133) e-mail: hburleson@att.net

December 4, 2000

TO: Mr. Charles Brantley
MICRON Technology
Boise, Idaho

RE: Our phone conversations this morning

Accompanying this is my English translation of Japanese Patent Release JP 56-73579 with the corrected fourth page, as you requested.

You will have noted that this patent copy was another "black blob" copy--many characters in the text so poorly copied that they have become black blobs. Over the years, I have had good cooperation from your Patent Division in getting the clearest possible copy to work with, but this was apparently one time when good copy simply was not available.

As you may know, the number of different characters used in such technical writing is upwards of 4,000 to 5,000. Small internal differences between characters totally change their meaning. So, in dealing with black-blob or too faint copy, a translator can only get so far by examining the context of the character or its general external shape.

I do not know what action the U.S. Patent Office can take; but, after translating in the past decade some two hundred Japanese patents, of which perhaps 10~15% were poor copy like this, I feel the Japanese Patent Office must, under international treaties and agreements, have a responsibility to do a better job of providing clear copy.

Hugh Burleson

(Translation)

(19) Japan Patent Office (JP)

(11) Patent Application Release

(12) **PUBLIC PATENT REPORT (A) 56[1981]-73579**

(43) Released: 6/18/81

(51) Int. Cl.[3] ID symbol Agency Control No.

B 05 D 7/04 7048-4F
G 03 C 1/74 7124-2H

Examination request: not yet requested
Items in request: 1 (Total: 3 pages)

---

(54) Method of Fabricating Coatings

(21) Patent application: 54(1979)-149792

(22) Applied for: 11/19/1979

(72) Inventor: Isamu Uchida
c/o Konishiroku Photo Industries. Ltd.
#1 Sakura-cho
Hino-shi [Tokyo, Japan]

(72) Inventor: Kiyoshi Kurihara
[same address]

(72) Inventor: Tomohisa Okuaki
[same address]

(72) Inventor: Hideyuki Hayakawa
[same address]

(72) Inventor: Masashi Gamo
[same address]

(72) Inventor: Kazuma Aizawa
[same address]

(72) Inventor: Toshio Tajima
[same address]

(71) Applicant: Konishiroku Photo Industries, Ltd.
26-2 Nishi-Shinjuku 1-chome
Shinjuku-ku, Tokyo [Japan]

(74) Agent: Yoshimi Kuwahara, Patent attorney

In a fabricating method for a coating material whereby one applies a coating solution to material to be coated to form a coating layer, suctions up coating solution from the sides?? of the said coating layer in a xxxx which the said coating layer xxxxs, and then xxxxs the above coating layer, the goal of this invention is achieved by spraying a liquid onto the edges?? of a coating layer from the center of a suction nozzle that suctions up coating solution, and by suctioning with this nozzle both this liquid and the coating solution of the coating layer xxxx.

We explain the details of this invention with the figures for the application example.

In Figures 1 and 2 suction nozzle 1 has suction port 2 on one end and liquid-extraction port 3 on the side. Inside, it is made so that xxxx screw 7 installed close to external liquid xxxx of liquid-spray nozzle by xxxx screw 6 which holds liquid spray nozzle 4 at the xxxx part 5 of suction nozzle 1 is xxxxed; and by having liquid-spray nozzle 4 rotate with respect to suction nozzle 1, one can voluntarily control the spacing of suction port 2 and liquid spray port 3 of liquid spray nozzle 4.

On the suction nozzle's side are three xxxx screw holes 9. One xxxxs xxxx bolts 10 in these to firmly attach one end of xxxx bolts 10 to the outside of liquid-spray nozzle 4. When one turns each of the three xxxx bolts 10, they move in the direction of their axis so that one can shift their position vis-a-vis suction port 2 and liquid-spray nozzle 4's liquid-spray port 3. The opposite end of liquid-spray nozzle 4"s liquid-spray port 3 is made so to be attachable?? to the bib that guides liquids. Suction nozzle 1's end 1a is made so to be attachable?? to suction nozzle 1's main body 1b. Dome part 1c of end 1b is made of a transparent material to facilitate inspections.

Next, we will explain how to apply this device when one applies a coating material having composite layers including a gelatin that gels the coating layer and dries it.

After applying a coating liquid in the xxxx xxxx process, suction port 2 is set immediately opposite thick part 11 of material to which coating 12 has been applied as shown in Figure 3, fixing this invention's suction nozzle in a position where it can contact the coating solution. It connects liquid-spray nozzle 4's xxxx end and liquid-storage vat to the pump's exhaust port via a pipe and connects liquid-extraction port 3 to a hydraulic device. With this arrangement if suctioning is done through the liquid-extraction port while sending warm water to liquid-spray nozzle 4, the coating solution of the thickly coated part that moves the xxxx of suction port 2 will be suctioned from suction port 2 with the warm water sprayed from liquid-spray nozzle 3; and the coating solution of the coated part's thick area will be removed. The liquid-spray nozzle, not being?? attached to the pump's exhaust port, is fed enough water merely by being connected by the piping to a warm-water vat.

The conditions of this xxxx can easily be found by experiments, but wer as follows for this example:

Diameter of liquid-extraction port	5.5mmϕ
Pressure at liquid-extraction port	-900mm/Aq[??]
Diameter of liquid-extraction hole	4mmϕ
Liquid volume through spray nozzle	200cc/min
Gap between duction port 2's tip and substance to be coated	180μ
Gap between spray port 10's outer wall & inner wall of suction nozzle 10's dome	1.5~2mm

The coating [??] removal device made with this invention has the advantage of making stable, extended operation possible without gumming up the suction port when removing thick coating solutions through having applied a coating liquid easily hardened by gelling, etc., by evaporating xxxx from the coating liquid or by chilling.

4. Simple Explanation of Figures

Figure 1 is a plane diagram of an application example of the thick xxxx removal device of this invention.

Figure 2 is a cross-sectional diagram of the device shown in Figure 1.

Figure 3 is a diagram illustrating in cross section the position relative to the coating substance.

[Keying symbols]

1 .. Suction nozzle
1a .. Suction nozzle 1's tip
1b .. Body of suction nozzle
1c .. Dome of suction nozzle
2 .. Suction port
3 .. Liquid-extraction port
4 .. Liquid-spray nozzle
5 .. Suction nozzle 1's rear surface
6 .. xxxx screw
7 .. xxxx screw
8 .. Liquid spray port
9 .. xxxx screw hole
10 .. xxxx bolt
11 .. Thick xxxx part
12 .. Substance to be coated

Agent: Yoshimi Kuwahara

Specifications

1. **Name of Invention:** Method of Fabricating Coatings

2. **Scope of Patent Application:** In a method of fabricating coating material by spreading a coating liquid on a substance to be coated to make a coating layer, suctioning the coating liquid from the edges?? of the said coated layer while the said coating layer is drying and then drying the above coating layer, a method of making a coating substance characterized by spraying a liquid onto the thickly coated part from the center of a suction nozzle that suctions off the coating liquid, combining this liquid with the coating solution of the coated thick area and drawing it into a suction nozzle.

3. **Detailed Explanation of Invention**

This invention is one bearing on a method of manufacturing a coating.

Generally, when a coating liquid is applied to a substance to be coated such as photo film base, etc., a thickened coating layer forms at the edges?? due to the effects of surface elasticity. The presence of these thickened edges?? markedly delays drying of the coated layer overall. Because of this, excessive drying strength is required. And, if one leaves these edges?? in an inadequately dried condition, the edge's coating liquid will stick to the xxxx rollers and be damaged. Or, if these edges?? feed onto the roller while inadequately dried, the edges?? will stick to the forward parts, giving rise to such damage as the coated material tearing when unwound in later manufacturing processes.

Known ways to eliminate such damage are the approach of doing coating by applying the coating liquid while exposing the surface to be coated to a spray of steam at both edges of the material being coated, and the method of forced drying by blowing heated air only on the edges?? of the coated layer in addition to normal drying. But, such methods need elaborate equipment and are quite troublesome to operate.

A way to eliminate such difficulties, known from Patent Release 52-38407, is using a liquid-suctioning bib (suction nozzle) which has an insulating jacket and suctioning the coating liquid at the edges?? of the coating layer. Yet, it has been found that with such a device the end of the bib's nozzle often becomes clogged with coating solution that adheres to it when applying coating for an extended time, so that it cannot adequately function.

So, the purpose of this invention is to provide a method to make a coating layer on the thick part of the coated edges?? which does not clog the nozzle end during long coating times due to coating solution adhering.